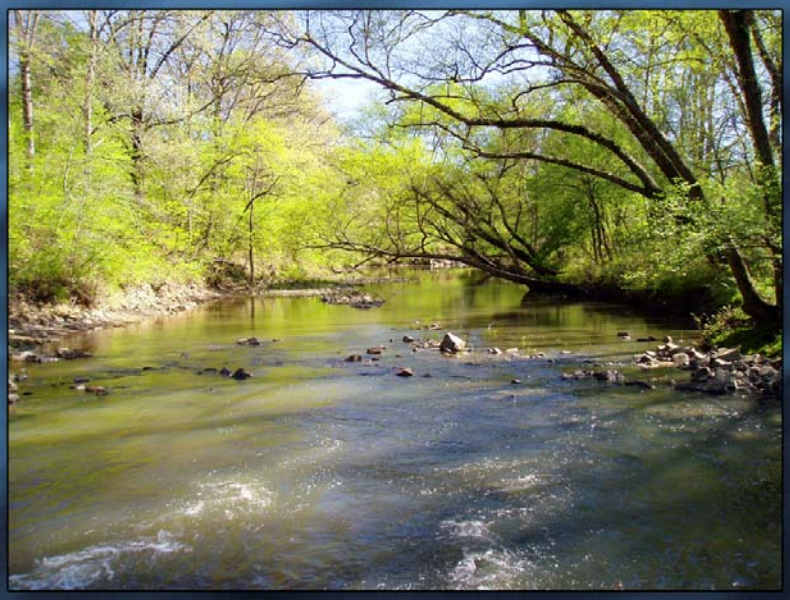
# 2007 Report of the Oklahoma BENEFICIAL USE MONITORING PROGRAM



# Streams Report

Published by
State of Oklahoma
OWRB
OKLAHOMA WATER RESOURCES BOARD
the water agency

## BENEFICIAL USE MONITORING PROGRAM COMPONENTS

- **Monitoring Rivers & Streams** - The BUMP program was created to meet a multitude of surface water monitoring needs. As in the original workplan, monitoring occurs on both lakes and streams. A companion report is available for lakes, which goes into detail on both the methodology and results of the lakes monitoring program. To date, the programs flowing water studies can be divided into four main categories—**Long-Term Fixed Station Monitoring, Probabilistic Monitoring, Short-term Rotating Station Monitoring, and Intensive Investigation**s. These portions of the program are dicussed in detail within the streams/rivers monitoring report.

- **Fixed Station Groundwater Monitoring** - Limited monitoring as part of this task has occurred in the program. Results of monitoring are presented in this report. OWRB staff has made recommendations in this report related to the scope and magnitude of groundwater monitoring activities that the state should pursue in the future. Any proposed groundwater monitoring efforts will be coordinated with the Oklahoma Department of Environmental Quality (ODEQ) program.

- **Fixed Station Lakes Monitoring** - Quarterly sampling (approximately once every 90 days) of approximately 55-60 lakes annually is currently occurring. This represents approximately a 40% increase in effort over historical BUMP Lake sampling efforts. In general, a minimum of three stations per reservoir, representing the lacustrine zone, transitional zone, and riverine zone are designated for sampling at each lake, with additional sites sampled as needed. Additional water quality parameters and lake sites were added to the lake sampling program beginning in 2001 to aid in making use support determinations.

## PROGRAM HISTORY/OVERVIEW

Sampling of the numerous lakes, streams, and rivers across this state was initiated in the summer and fall of 1998. Lake sampling in connection with the Beneficial Use Monitoring Program began in July of 1998. Sampling on numerous streams and rivers began in earnest in November of the same year. The two sampling programs, one for lakes and one for streams had separate starting dates for a number of reasons. First, the OWRB has been conducting a lake-sampling program during the warmer summer months since 1990 as part of the Federal Clean Lakes Program. This historical lake sampling program was funded through federal dollars with the express purpose of determining lake trophic status. The trophic status of a reservoir can range from oligotrophic (low biological productivity) to hyper-eutrophic (excessive biological productivity). In general, the more productive a reservoir, the more water quality problems it is likely to experience. Federal dollars to fund this trophic state assessment of our state's lakes were discontinued in 1994. At that time, the OWRB searched for other funding sources, and through working with the Secretary of the Environment and the Oklahoma Conservation Commission, the Water Board was able to obtain a one time federal 319 nonpoint source grant to continue the lake trophic state assessment program. The OWRB subsequently initiated a quarterly lake sampling program in the spring of 1998 and was able to roll the existing lake program into the BUMP.

For streams, no such comprehensive, statewide sampling effort was ongoing at the time the BUMP was funded. Because of this, the OWRB required a number of months to re-allocate staff

and implement a monitoring regime on streams. In addition, OWRB staff greatly desired input from the other environmental agencies on the placement of stream monitoring stations. The existence of a previous statewide stream-monitoring network greatly aided in sample site selection. This historical ambient trend stream-monitoring network existed from 1975 until 1993 and was implemented by the Oklahoma State Health Department. Although this program did not evaluate sample results through comparison with the OWQS criteria or determine use support, it did provide a framework upon which to build. The historical sampling network sampled streams on a monthly basis from 1975-1986 and on a semi-annual basis from 1987-1993. Based upon the historical program and input from other agencies, the OWRB has established an ambient monitoring network of 100 active permanent stations with numerous rotational sites. Both the permanent and rotational networks are evaluated annually to determine if any stations should be dropped and others added. The Water Resources Board relies heavily on the other state and federal agencies for input into this process. With continued funding it is the desire of BUMP staff to increase the number of permanent sites to 120 to more effectively monitor our stream resources. In addition, monitoring personnel with the OWRB work closely with the other state environmental agencies to avoid duplication of sampling effort (i.e. the Oklahoma Conservation Commission rotating and data gaps sampling initiatives), except on a very limited basis for quality assurance purposes. A very small number of sites that are duplicative in nature do allow for the comparison of results between sampling programs to ensure that sampling protocols and the Use Support Assessment Protocols (USAP - described below) are working effectively and that decisions on support status are being made in a consistent manner.

The OWRB has developed Use Support Assessment Protocols (USAP) for lakes and streams, which are essential if the state is to be consistent in identifying waters that are not meeting their assigned beneficial uses or are threatened. The Water Resources Board has incorporated the USAP into Oklahoma Administrative Code (OAC) 785:46 to ensure that consistent determinations for impairments are made by the all of the monitoring agencies. The state must follow consistent procedures for listing waters as impaired. Using the OWRB Use Support Assessment Protocols, it is possible for OWRB staff to assess whether threats or impairments are present in our waterways. With continued funding, identification of impaired waters will be accomplished on additional waters.

## RESULTS OF STREAM SAMPLING EFFORTS

It is essential that Oklahoma quantify impacts in a comprehensive and scientific manner and look for trends in water quality to identify waters that are not meeting their assigned beneficial uses. As a state, we must manage our water resources effectively and direct money to areas in most need of protection or remediation to ensure that we continue to have good quality and sufficient quantity of water to meet our needs well into the 21st century. Comprehensive statewide data sets on rivers and streams for accurately assessing beneficial use impairments has not existed since 1993. With the implementation of monitoring on a large scale in October of 1998, this is no longer the case. With the availability of data, it is the desire of the Oklahoma Water Resources Board to provide the legislature and professional water managers with a comprehensive and up-to-date document for their review and approval. Administrative and Technical staff at the OWRB look forward to conducting the Beneficial Use Monitoring Program far into the future and providing the state of Oklahoma with the information it needs to make informed decisions that allow us to effectively manage our precious water resources.

The BUMP permanent ambient trend stream monitoring sites and their associated beneficial uses are listed in Table 1. Beneficial uses that are not being met are shown in **RED**. Listed next

**Table 5.** Permanent Ambient Trend Monitoring Stations and their Beneficial Use Support Status.

| STATION NAME | FWP | PBCR | PPWS | AG | AES |
|---|---|---|---|---|---|
| Arkansas River, US 64, Moffett | S | NS (8) | S | NS (10) | NT |
| Arkansas River, SH 104, Haskell | NS (18) | NS (8) | N/A | NS (10) | NT |
| Arkansas River, SH 18, Ralston | NS (5) | NS (8) | S | S | NT |
| Arkansas River, SH 97, Sand Springs | NS (18) | S | N/A | NS (10) | NT |
| Arkansas River, US 62, Muskogee | NS (3) | NS (8) | N/A | NS (10, 11) | T (17) |
| Arkansas River, US 64, Bixby | S | NS (6, 8) | N/A | NS (10) | NT |
| Barren Fork, SH 51, Eldon | S | NS (8) | S | S | NS (14) |
| Beaver River, off US 64, Guymon | NS (1) | NS (6, 7, 8) | S | S | NT |
| Beaver River, US 83, Turpin | S | NS (6, 7, 8) | N/A | NS (10, 11) | NT |
| Beaver River, SH 23, Beaver | S | NS (6, 7, 8) | N/A | NS (10, 11, 12) | NT |
| Beaver River, US 283, Laverne | S | NS (6, 7, 8) | N/A | S | NT |
| Beaver River, CR N1650, Gate | S | NS (6, 8) | N/A | NS (10, 11) | NT |
| Beaver River, US 183, Fort Supply | S | NS (8) | N/A | S | NT |
| Big Cabin Creek, off US 69, Big Cabin | NS (18) | NS (8) | NS (6) | NS (12) | NT |
| Bird Creek, SH 266, Port of Catoosa | NS (5, 18) | NS (6, 7, 8) | S | NS (12) | T (13) |
| Black Bear Creek, SH 18, Pawnee | NS (3, 5) | NS (6, 8) | S | S | NT |
| Blue River, US 70, Durant | S | NS (8) | S | S | NT |
| Brushy Creek, off US 270, Haileyville | NS (1, 3, 5, 18) | NS (8) | S | NS (12) | NT |
| Canadian River, SH 2, Whitefield | S | S | S | S | NT |
| Canadian River, US 183, Taloga | S | NS (8) | N/A | NS (10, 11, 12) | NT |
| Canadian River, US 270, Calvin | NS (3, 5, 18) | NS (8) | S | NS (10, 12) | T (17) |
| Canadian River, US 377, Konawa | NS (3, 5, 18) | NS (8) | S | NS (10) | T (17) |
| Canadian River, US 66, Bridgeport | NS (5) | NS (8) | N/A | S | NT |
| Canadian River, US 77, Purcell | NS (5, 18) | NS (8) | N/A | S | T (13, 17) |
| Caney Creek, off SH 100, Barber | S | NS (8) | S | S | NT |
| Caney River, off US 75, Ramona | NS (3, 5) | NS (8) | S | S | T (17) |
| Chickaskia River, US 177, Blackwell | NS (5) | NS (6, 8) | S | S | NT |
| Cimarron River, off SH 8, near Ames | S | NS (7, 8) | N/A | NS (10, 11, 12) | NT |
| Cimarron River, SH 34, Buffalo | S | NS (6, 7, 8) | N/A | NS (10,11) | NT |
| Cimarron River, SH 99, Oilton | NS (5) | NS (6, 8) | N/A | NS (10) | NT |

| STATION NAME | FWP | PBCR | PPWS | AG | AES |
|---|---|---|---|---|---|
| Cimarron River, US 77, Guthrie | S | NS (8) | N/A | S | T(17) |
| Cimarron River, US 81, Dover | S | NS (7, 8) | N/A | NS (10, 11) | NT |
| Cimarron River, off US 64, Mocane | S | NS (6, 8) | S | S | NT |
| Cimarron River, SH 33, Ripley | NS (5) | NS (8) | N/A | NS (10) | NT |
| Cimarron River, US 281, near Waynoka | NS (16) | NS (7) | N/A | NS (10, 11) | NT |
| Clear Boggy Creek, off US 69, Caney | NS (3, 5) | NS (8) | S | S | T(17) |
| Deep Fork River, off SH 16, Beggs | NS (5, 18) | NS (6, 8) | S | S | NT |
| Deep Fork River, US 377, Stroud | NS (3, 5) | NS (6, 8) | NS (9) | S | NT |
| East Cache Creek, SH 53, Walters | NS (5) | NS (6, 8) | S | NS (10) | NT |
| Elk Creek, off US 183, Roosevelt | NS (5) | NS (6, 8) | S | S | NT |
| Elk River, SH 43, Tiff City (MO) | S | S | S | S | NT |
| Elm Fork River, SH 9, Granite | S | NS (6, 7, 8) | S | NS (11) | NT |
| Flint Creek, US 412, Flint | S | NS (8) | S | S | NS (14) |
| Fourche-Maline Creek, off US 270, Red Oak | NS (1, 3) | NS (8) | S | S | NT |
| Glover River, SH 3, Glover | NS (3, 5) | S | S | S | NT |
| Honey Creek, off SH 25, Grove | S | NS (8) | S | S | NT |
| Illinois River, US 59, Watts | NS (5) | NS (8) | S | S | NS (14) |
| Illinois River, US 62, Tahlequah | S | NS (8) | S | S | NS (14) |
| Kiamichi River, off US 271, Tuskahoma | NS (3) | NS (8) | S | S | NT |
| Kiamichi River, SH 63, Big Cedar | NS (3, 4) | NS (8) | S | S | NT |
| Kiamichi River, US 271, Antlers | NS (3) | NS (8) | S | S | NT |
| Kiamichi River, SH 109, Fort Towson | NS (2, 3) | NS (8) | S | S | NT |
| Lee Creek, SH 101, Short | NS (3) | NS (8) | S | S | S |
| Little River, off SH 3, Cloudy | NS (3, 5) | NS (8) | S | S | NT |
| Little River, off US 70, near Holly Creek | NS (1, 5) | S | S | S | NT |
| Little River, SH 56, Sasakwa | NS (3, 18) | NS (6, 8) | S | S | NT |
| Mountain Fork, SH 4, Smithville | NS (3, 5) | NS (8) | S | S | NS (14) |
| Mountain Fork, US 70, Eagletown | NS (2, 3) | NS (8) | S | S | NT |
| Mud Creek, SH 32, Courtney | NS (1, 3, 5) | NS (6, 8) | S | S | NT |
| Muddy Boggy Creek, US 70, Unger | NS (3, 5, 18) | NS (8) | S | S | NT |
| Muddy Boggy Creek, US 69, Atoka | NS (1, 3, 5) | NS (6, 8) | S | S | NT |
| Neosho River, off US 66, Commerce | NS (3, 5) | NS (8) | S | S | NT |

| STATION NAME | FWP | PBCR | PPWS | AG | AES |
|---|---|---|---|---|---|
| NEOSHO RIVER, OFF SH 137, CONNOR BRIDGE | NS (2, 3, 5) | S | S | S | NT |
| NEOSHO RIVER, SH 82, LANGLEY | NS (1) | S | S | S | NT |
| NEOSHO RIVER, US 412, CHOUTEAU | NS (1, 3) | S | S | S | NT |
| NORTH CANADIAN RIVER, IND. NAT. TPK., DUSTIN | NS (3, 5) | NS (6, 8) | S | S | T (13) |
| NORTH CANADIAN RIVER, SH 3E, SHAWNEE | NS (3, 4, 5) | NS (8) | N/A | S | T (13, 17) |
| NORTH CANADIAN RIVER, OFF US 62, HARRAH | NS (dieldrin) | NS (6, 8) | N/A | NS (10) | T (13, 17) |
| NORTH CANADIAN RIVER, US 270, WATONGA | S | NS (6, 7, 8) | S | S | NT |
| NORTH CANADIAN RIVER, US 281, SEILING | NS (5) | NS (8) | S | S | NT |
| NORTH CANADIAN RIVER, US 75, WETUMKA | NS (3, 4, 5) | NS (8) | S | S | T (13, 17) |
| NORTH CANADIAN RIVER, US 412, WOODWARD | S | NS (8) | N/A | S | NT |
| NORTH CANADIAN RIVER, US 81, EL RENO | S | NS (6, 8) | S | S | NT |
| NORTH FORK OF THE RED RIVER, US 62, HEADRICK | NS (5) | NS (8) | S | NS (10, 11) | T (17) |
| NORTH FORK OF THE RED RIVER, SH 34, CARTER | NS (5) | NS (8) | S | S | NT |
| POTEAU RIVER, OFF SH 112, POCOLA | NS (3, 5) | NS (8) | S | S | NT |
| POTEAU RIVER, US 59, HEAVENER | S | S | S | S | NT |
| RED RIVER, US 183, DAVIDSON | NS (3, 5) | NS (6, 8) | N/A | NS (10, 11, 12) | T (17) |
| RED RIVER, US 259, HARRIS | NS (5, 18) | S | S | S | NT |
| RED RIVER, US 271, HUGO | NS (5, 18) | NS (8) | S | NS (10, 11, 12) | NT |
| RED RIVER, US 81, TERRAL | NS (5) | NS (8) | S | NS (10, 11, 12) | NT |
| SAGER CREEK, OFF US 412, WEST SILOAM SPRINGS | S | NS (8) | NS (nitrates) | S | T (13, 15) |
| SALT FORK OF THE ARKANSAS, SH 58, INGERSOLL | NS (5) | NS (6, 7, 8) | S | NS (12) | NT |
| SALT FORK OF THE ARKANSAS, US 77, TONKAWA | NS (5) | NS (8) | S | S | NT |
| SALT FORK OF THE RED RIVER, OFF US 283, ELMER | NS (3) | NS (6, 8) | S | S | T (17) |
| SANDY CREEK, SH 6, ELDORADO | NS (2, 3, 5) | NS (8) | N/A | NS (10, 11, 12) | NT |
| SKELETON CREEK, SH 74, LOVELL | NS (5, 18) | NS (6, 8) | S | S | NT |
| SPRING CREEK, OFF US 412, MURPHY | S | S | S | S | NT |
| SPRING RIVER, OFF SH 137, QUAPAW | NS (2. 3, 5) | NS (8) | S | S | NT |
| VERDIGRIS RIVER, US 412, INOLA | NS (3, 5) | NS (8) | S | S | NT |
| VERDIGRIS RIVER, SH 10, LENEPAH | NS (3, 5) | NS (8) | S | S | NT |
| VERDIGRIS RIVER, SH 20, KEETONVILLE | S | NS (8) | S | S | NT |
| VERDIGRIS RIVER, SH 51, WAGONER | NS (2, 3, 5) | NS (8) | S | S | NT |
| WASHITA RIVER, OFF SH 19, ALEX | NS (5) | NS (6, 8) | S | S | T (17) |

| STATION NAME | FWP | PBCR | PPWS | AG | AES |
|---|---|---|---|---|---|
| WASHITA RIVER, SH 152, CORDELL | NS (5, 16) | NS (6, 7, 8) | S | S | NT |
| WASHITA RIVER, SH 19, PAULS VALLEY | NS (5) | NS (6, 8) | S | S | NT |
| WASHITA RIVER, SH 33, MCCLURE | NS (5, 16) | NS (6, 7, 8) | S | S | NT |
| WASHITA RIVER, US 177, DURWOOD | NS (5) | NS (6, 8) | S | S | T (17) |
| WASHITA RIVER, US 281, ANADARKO | NS (5, 16) | NS (6, 8) | S | S | T (17) |
| WEST CACHE CREEK, SH 5B, TAYLOR | NS (5) | NS (6, 7, 8) | S | NS (10,11) | NT |
| WOLF CREEK, OFF US 270, FORT SUPPLY | S | NS (8) | S | S | NT |

STREAM MONITORING PROGRAM

| ASSIGNED OWQS BENEFICIAL USES | |
|---|---|
| FWP = FISH & WILDLIFE PROPAGATION | PBCR = PRIMARY BODY CONTACT RECREATION |
| PPWS = PUBLIC AND PRIVATE WATER SUPPLY | AG = AGRICULTURE |
| AES = AESTHETICS | |

| SUPPORT CODES | | |
|---|---|---|
| S—FULLY SUPPORTING | NS—NOT SUPPORTING | N/A—NOT APPLICABLE |
| NT-NOT THREATENED (NUTRIENTS) | T-THREATENED (NUTRIENTS) | NO DATA—INSUFFICIENT INFO |

| WATER QUALITY VARIABLES | | |
|---|---|---|
| 1—DISSOLVED OXYGEN | 2—METALS (ACUTE) | 3—METALS (CHRONIC) |
| 4—PH | 5—TURBIDITY | 6—FECAL COLIFORM |
| 7— *ESCHERICHIA COLI* | 8— Enterococci | 9—METALS |
| 10— TOTAL DISSOLVED SOLIDS | 11— CHLORIDES | 12— SULFATES |
| 13— TOTAL PHOSPHORUS (TP) | 14—TP OK SCENIC RIVER CRITERION | 15— NITRITE + NITRATE |
| 16—BIOCRITERIA | 17—SESTONIC CHLOROPHYLLL-A (TSI) | 18—VISUAL OIL AND GREASE |